

ABSTRACT

An improved buried strap method in the fabrication of a DRAM integrated circuit device is described. A deep trench is etched into a substrate. A collar is formed on an upper portion of the deep trench. A buried plate is formed by doping around a lower portion of the deep trench and a capacitor dielectric layer is formed within the deep trench. The deep trench is filled with a silicon layer wherein the silicon layer forms a deep trench capacitor and covers the collar. The silicon layer is recessed below a top surface of the substrate to leave a recess. A top portion of the collar is etched away to leave a collar divot. A hemispherical grain polysilicon layer is selectively deposited into the deep trench and filling the collar divot. The HSG layer is doped in-situ or by post plasma doping. The doped hemispherical grain polysilicon layer forms a buried strap in the fabrication of a deep trench DRAM integrated circuit device.